Division Regulation 1110-1-310

DEPARTMENT OF THE ARMY
Mississippi Valley Division, Corps of Engineers
Vicksburg, Mississippi
Regulation No. 1110-1-310 1 October 95
Engineering and Design
PERIODIC INSPECTION AND CONTINUING EVALUATION OF
COMPLETED CIVIL WORKS STRUCTURES

This Regulation will be supplemented by the District Engineer and five copies of the Supplement furnished LMVD, ATTN: CELMV-ET-EG.

1. Purpose. To prescribe responsibilities and procedures for administering and complying with ER 1110-2-100, Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures.

2. Applicability. This regulation is applicable to the Division Office and its four Districts.

3. References.

a. ER 1110-2-100

b. ER 1110-2-101

4. General. The program for the periodic inspection and continuing evaluation of completed civil works structures, as established by ER 1110-2-100 is an important and vital function in ensuring the continued structural stability and operational adequacy of completed structures within the Mississippi Valley Division. Each District will comply with the provisions of ER 1110-2-100 and the additional guidance contained in this Directive. Each District shall place on this program the degree of emphasis necessary to ensure that the program functions in a smooth and efficient manner. This is necessary to ensure that the program accomplishes its objectives.

5. Organization. The Engineering Division within each District will contain an organizational element specifically assigned to administering the periodic inspection program. This element will be headed by an individual responsible for accomplishment of the District's program and will include an adequate staff to ensure that the program functions in an efficient and effective manner. Close liaison with personnel of the District Construction and Operations Divisions will be required.

6. Funding. Funding for the inspection and evaluation program will be in accordance with the following:

a. The costs of the program for any structure in a project which has received Operation and Maintenance, General funds or MR&T Maintenance funds will be charged to such funds in accordance with ER 1110-2-100.

b. The costs of the program for completed structures prior to receipt of O&M, General funds or MR&T Maintenance funds will be charged to cost account 51, Operation and Maintenance Expense During Construction, in accordance with ER 11-2-240, Appendix A.

c. Funding for the initial inspection of newly completed structures, which will be turned over to local interests for operation and maintenance, will be in accordance with para 6b above. Inspection costs for Engineering Division personnel and costs of obtaining and evaluating instrumentation data for subsequent inspections of structures operated and maintained by local interests will be budgeted under the subclass "Inspection of Completed Flood Control Works," Appropriation MR&T Maintenance or O&M General, as appropriate.

7. Inspection Schedules.

a. A list of structures included in the periodic inspection program, a schedule for inspections, and the status of each inspection report will be furnished LMVD, ATTN: CELMV-ET-EG, not later than one month prior to the end of each fiscal year by each District. Projects operated and maintained by local interests will be included; however, separate schedules will be furnished for Corps projects and for projects operated and maintained by local interests. District periodic inspection program coordinators shall keep CELMV-ET-EG advised of schedule changes including inspection report submittals.

b. The format of the schedules will be similar to that prescribed in Figure 1. The first column will always be the fiscal year in which the schedules are prepared. Successive columns will project inspection schedules 5 fiscal years in advance, exclusive of the fiscal year of preparation. The status of reports on inspections made in the current fiscal year will be indicated in the first column by footnote reference. Other information considered appropriate should also be furnished. A computer program is available for District use in keeping this schedule and will be distributed under separate cover. Use of this program is optional.

c. When at all possible, inspections should be scheduled at such times when water levels and other conditions at the structure are optimum for observations and operation of the structure. Inspections should also be scheduled to the extent possible during periods when structures are in an unwatered condition. In addition, structures in the same general area should be inspected on the same inspection trip, when practical.

7.1. Inspection of Stilling Basins and Downstream Scour Protection.

a. A systematic plan for the inspection of stilling basins and downstream scour protection at completed Civil Works structures will be established through coordinated efforts of the Operations and Engineering Divisions. The necessary arrangements, budgeting, and coordination shall be accomplished so that the condition of these features can be evaluated and/or inspected as a part of scheduled periodic inspections whenever practical.

b. Where feasible and practical, stilling basins should be completely unwatered for inspection. The condition of the downstream protection should also be determined by closely gridded underwater surveys and probings. Where unwatering the stilling basins is impractical for engineering and/or economic reasons, the inspections should be made by a diver and/or other appropriate underwater techniques. Such underwater inspections and surveys of scour protection should be performed sufficiently in advance of the scheduled periodic inspection so that the results will be available during the periodic inspection. The results of these underwater inspections and surveys will then be evaluated by the periodic inspection team to determine the necessity for more detailed inspection and/or corrective actions.

c. Stilling basins and downstream scour protection associated with various types of structures shall be inspected on the schedules indicated in the Table 1 below. However, if instrumentation data indicate a critical problem has developed or if a critical problem is otherwise known to have developed, the stilling basin and/or downstream scour protection shall be inspected promptly so that appropriate corrective action can be taken to correct the problem.

Table 1: INSPECTION OF STILLING BASIN AND/OR DOWNSTREAM SCOUR PROTECTION

Type Structure	Frequency of Inspection in Years		
	5	10	15
Outlet Works at Reservoirs with Permanent Pools	X		
Pumping Stations	X		
Flood Control Structures other than Pumping Stations (1)		X	
Outlet works at Reservoirs without permanent pools		X	
Drainage Structures		X	
Navigation Dams		X	
Emergency Spillways at Reservoirs (1)			X

(1) Also inspect after extended periods of high flows.

d. Reporting. A report on stilling basin and downstream scour protection inspections made concurrently with periodic inspections will be made a part of the periodic inspection report. The report will include reference to previous stilling basin inspection reports (if any), water release data, method of inspection, method of unwatering (if unwatered), condition of the stilling basin, condition of the downstream scour protection, amount, size, and source of any rock found in the basin, corrective work performed (if any), photographs, plan and profiles of surveys, and conclusions and recommendations. Recommendations as to method and schedule for the next inspection of the stilling basin and downstream scour protection should be a part of this report. Similar reports should also be made on any interim inspections.

8. Notification of Inspections. CELMV-ET-EG will be advised of the date of each inspection at least 30 days in advance.

9. Preinspection Brochures. A preinspection brochure, prepared by the responsible District, is required for each project to be inspected which is operated and maintained by the Corps of Engineers. Brochures will also be prepared for projects operated and maintained by local interests that are to be inspected because of unusual conditions or are newly completed structures to be transferred to local interests. Four copies of the preinspection brochure will be furnished CELMV-ET-EG at least two weeks prior to the date of the inspection. Preinspection brochures are not required for inspections of structures operated and maintained by local interests other than those discussed above in this paragraph. Preinspection brochures will usually contain, as a minimum, the following:

a. Pertinent project data.

b. Plan and typical section drawings of project structures.

c. Summary of subsurface soil profile and boring logs.

d. Summary of mechanical, electrical, structural, material, and foundation conditions.

e. History of problems or deficiencies observed during or since the previous inspection and remedial action taken. On initial inspections, this information should consist of problems incurred during the previous life of the structures.

f. Location of all instrumentation on plans and sections.

g. Current plots of instrumentation data.

h. Analyses of instrumentation data and evaluation of structural performance and safety.

i. A check list for conducting the inspection.

j. For a water control structure, a brief discussion of the operation procedures for the control feature of the project; i.e., gate operation, lock operation, pumping procedures, etc. including any design operational constraints.

10. Reports of Inspections of Structures Operated and Maintained by the Corps. In addition to the items discussed in para 4 of Appendix A, ER 1110-2-100, the following items will also be included in reports of inspections of structures operated and maintained by the Corps.

a. Drawings of the structure and its components clearly showing the location of all instrumentation on plans and sections.

b. Brief description of foundation conditions including a summary of subsurface soil and/or rock profiles and representative boring logs.

c. History of past problems or deficiencies and remedial action taken. Reports subsequent to the initial inspection report need only include problems incurred and remedial action taken since the previous inspection.

d. Plots of representative instrumentation data. The plots should contain data for at least the last 5 years of observations, where data have been obtained for that period of time.

e. A clear description of proposed remedial actions, cost estimates, availability of funds, dates, and time frames for accomplishment. If further studies are necessary to determine the remedial actions required, inspection reports will indicate such and will include dates for submitting the results,of such studies. Care should be taken to insure that reports are complete and include all items discussed at the inspection.

11. Submittal of Inspection Reports. A thorough technical review of each inspection report shall be performed before submittal to CELMV-ET-EG for approval. The transmittal memorandum shall indicate the means by which technical review was accomplished. A 120-day time interval is allowed after inspections for submittal of inspection reports; however, the 120-day limit should not be set as a target date for submitting all reports as this could lead to delays beyond the 120-day limit. The allotted time interval is considered adequate and shall not be exceeded except in extremely unusual circumstances. CELMV-ET-EG shall be notified in the event report submittal will be late. Four copies of each report should be submitted.

12. Inspections of Structures Operated and Maintained by Local Interests. Inspections of projects operated and maintained by local interests that are conducted because of unusual conditions or for newly completed structures to be transferred to local interests will be conducted in a manner similar to inspections of Corps operated and maintained projects. Other inspections of projects operated and maintained by local interests may be conducted on a less formal basis and will be accomplished in conjunction with the annual maintenance inspection program as prescribed by DIVR 1130-2-304. Appropriate District Engineering Division personnel will accompany the District Operations Division

personnel on these maintenance inspections to evaluate the safety and stability of the structures. District Engineering Division personnel will participate in the maintenance inspections at least every 5 years, or more frequently, if necessary. CELMV-ET-EG will be notified of these inspections in accordance with the provisions of 8 above to afford LMVD personnel an opportunity to participate if desired.

13. Reports of Inspections of Structures Operated and Maintained by Local Interests. Reports of inspections of projects operated and maintained by local interests that are conducted because of unusual conditions or for newly completed structures to be transferred to local interests will be prepared and reviewed similarly to reports of inspections of Corps operated and maintained projects. When structures are inspected in conjunction with the annual maintenance inspection program, a formal inspection report is not required; however, a trip report of the inspection will be prepared and submitted to CELMV-ET-EG for information within 120 days after the inspection. The trip report will be prepared by the organizational element that is responsible for the periodic inspection program. The trip report will include information necessary to determine the structural stability and operational adequacy of the project. The District Engineering Division will notify the District Operations Division of any deficiencies in maintenance observed during the inspection for which local interests are responsible and which could affect the structural stability or operational adequacy of the project. These deficiencies will be coordinated with local interests for corrective action.

14. Levee Inspections. The inspection of the major levee systems in LMVD is included in the periodic inspection program in accordance with ER 1110-2-100, and therefore the provisions of this regulation apply in ensuring the continued integrity of these embankments and any associated underseepage control measures. Levees are inspected yearly by District Operations Division personnel together with local interests as part of the annual maintenance inspection program. In keeping with its responsibility, appropriate District Engineering Division personnel will participate in these levee maintenance inspections on a periodic basis, and no less frequently than every 5 years for any particular levee reach. Upon completion of an inspection, a trip report similar to that indicated in 13 above will be prepared and furnished to CELMV-ET-EG for information within 120 days after the inspection. In Districts where appropriate design engineers participate in levee maintenance inspections on an annual basis, the 5-year reporting procedure is not required.

15. Frequency of Inspections. The frequency of inspections will conform to the guidance presented in para 5a of ER 1110-2-100 and as prescribed in 12 and 14 above.

16. Remedial Measures. The effectiveness of the periodic inspection program is dependent upon the procedures used to ensure that remedial measures necessary to correct structural and operational deficiencies observed during inspections are accomplished as expeditiously as possible. The organizational element responsible for the periodic inspection program in each District will monitor the progress of all remedial measures and establish appropriate follow-up procedures to insure that remedial measures are accomplished. Funds required to accomplish necessary remedial measures should be

properly programmed into the District's O&M budget requests. In regard to structures operated and maintained by the Corps of Engineers, information relative to remedial measures to be included in periodic inspection reports is discussed in para 13e above. In some instances, remedial actions required as a result of observed critical conditions may require immediate attention. In these cases remedial measures will not be delayed until submittal of the inspection report but will be accomplished before more serious conditions develop which could result in failure of the structure or require more costly repairs. The District will take action with local interests to ensure the expeditious accomplishment of remedial measures affecting the stability and operational adequacy of projects for which local interests are responsible. The District will include an update of the status of remedial measures on all reservoir projects in the periodic inspection program in its annual summary report of inspections conducted during the year (ref 3a para 7 a(2)).

17. Instrumentation. Memorandam advising CELMV-ET-EG of the results of the analysis of instrumentation data from projects listed in Figure 2 will be furnished on an annual basis and will include a discussion of any unusual conditions noted at the time of observation and any potentially critical conditions indicated. Proposed remedial measures, if necessary, should also be discussed. If no unusual conditions are noted, the memoranda will so indicate.

18. Continuing Surveillance. The surveillance of structures for potential problems should not be limited to times when scheduled periodic inspections are made or when instrumentation data are obtained. Such surveillance should be of a continuing day-to-day nature and should include electrical and mechanical features as well as structural, soils, and foundations items. Any problems noted as the result of this continuing surveillance relating to the operation or structural safety of a structure should be reported promptly to the District Office for evaluation. This should be emphasized to all appropriate field and project operating personnel as well as office personnel having responsibility for coordinating or participating in periodic inspections. Additional requirements in this regard are also provided in reference 3a, paragraphs 4a(1) and 5a(1)(e).

19. Reporting Evidence of Distress. Evidence of distress noted at civil works projects as a result of continuing surveillance or analysis of instrumentation data will be reported in accordance with the provisions of ER 1110-2-101.

FOR THE DIVISION ENGINEER:

2 Encl

Figures 1 and 2

DISTRIBUTION: B, C, D, & F

Structure	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99
LOCKS						
Algiers					Sep 98	
Bayou Boeuf				Sep 97		
Bayou Sorrel				Jul 97		
Berwick	Oct 93 #		Jun 96 *			
Calcasieu			Nov 95		Jun 98	
Freshwater Bayou		Sep 95				
Harvey	Mar 94 +					Mar 99
IHNC					Aug 98	
Leland Bowman		Jul 95		Jun 97 *		
Old River	Nov 94 +	Jul 95 *				
Port Allen					Nov 97	
PUMPING STATION						
Point Coupee'	Oct 93 @					Dec 98
FLOODGATES						
Charenton		Nov 94 +				Dec 98
E. Calumet		Jul 95				
W. Calumet		Jul 95				
CONTROL STRUCTURES						
Bonnet Carre'	Aug 94 +					Aug 99
Calcasieu R. Saltwater Barrier		Jun 95 *				

Catfish Point			Nov 95			Jun 99 *
Morganza		Nov 94 +				
Old River Auxiliary			Sep 96			
Old River Low Sill			Sep 96			
Old River Overbank			Sep 96			
Schooner Bayou				Jun 97		
DRAINAGE STRUCTURES						
Bayou Courtableau					Jun 98	
Bayou Darbonne					Jun 98	
Point Coupee'					Jun 98	
Wax Lake E.				Jan 97		
Wax Lake W.				Jan 97		
Notes: @ Approved * Dewatering # Submitted > Major Repairs + To be submitted						

Annual Analysis of Instrumentation Data
Project List

St. Louis District

Carlyle Lake Reservoir

Lake Shelbyville Reservoir

Rend Lake Reservoir

Clarence Cannon Reservoir

Wappappello Lake Reservoir

Mississippi River Locks and Dams

Kaskaskia River Lock and Dam

Memphis District

W.G. Huxtable Pumping Plant

Vicksburg District

Yazoo Basin Reservoirs

Lake Ouachita Reservoir

Lake Greeson Reservoir

DeGray Lake Reservoir

Yazoo City Pumping Station

Tensas-Cocodrie Pumping Station

Lake Chicot Pumping Station

Ouachita River Locks and Dams

Red River Locks and Dams

Steele Bayou Drainage Structure

Little Sunflower Drainage Structure

New Orleans District

Algiers Lock

Harvey Lock

Inner Harbor Navigation Canal Lock

Old River Lock

Port Allen Lock

Old River Complex